Amendments to the Claims:

Claims 1 through 27 have been amended herein. Please note that all claims currently pending and under consideration in the referenced application are shown below. Please add claims 28 and 29. Please enter these claims as amended. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A core bit, comprising:

a bit body having a face surface with a throat opening thereinto, ~~said~~the throat extending to a longitudinal cavity;

at least one cutter disposed on ~~said~~the face surface; and

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through the bit body between at least one port inlet and at least one port outlet~~through said bit body having one end thereof in fluid communication with said at least one port outlet~~; ~~and~~

wherein the at least one port outlet is formed in the face surface of the bit body;

wherein the at least one port inlet is ~~at least one~~ conically shaped and opens ~~port inlet opening~~ into ~~said~~the longitudinal cavity~~and in fluid communication with another end of said at least one bore~~.

2. (Currently Amended) A core bit, comprising:

a bit body having a face surface with a throat opening thereinto, ~~said~~the throat extending to a longitudinal cavity;

at least one cutter disposed on ~~said~~the face surface; and

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet~~having one end thereof in fluid communication with said at least one port outlet~~; ~~and~~

wherein the at least one port outlet is formed in the face surface of the bit body;

wherein the at least one port inlet ~~at least one port inlet including~~ includes a first end having a first cross-sectional area joined to ~~another end of said~~the at least one bore and extending to a second end having a second cross-sectional area larger than ~~said~~the first cross-sectional area, the second end ~~and~~ opening into ~~said~~the longitudinal cavity.

3. (Currently Amended) The core bit of claim 2, wherein ~~said~~the at least one port inlet comprises a generally conical shape.

4. (Currently Amended) The core bit of claim 2, wherein ~~said~~the at least one port inlet comprises a generally pyramidal shape.

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5. (Currently Amended) A core barrel assembly for cutting core samples in subterranean formations, comprising:

an outer barrel having one end attached to a drill string;

an inner barrel assembly rotatably disposed inside ~~said~~the outer barrel, ~~said~~the inner barrel assembly including an inner tube and a core shoe attached to one end of ~~said~~the inner tube;

a core bit attached to an opposing end of ~~said~~the outer barrel proximate ~~said~~the core shoe, ~~said~~the core bit including:

a bit body having a face surface with a throat opening thereinto, ~~said~~the throat extending to a longitudinal cavity;

at least one cutter disposed on ~~said~~the face surface;

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet ~~having one end thereof in fluid communication with said at least one port outlet~~; ~~and~~

wherein the at least one port outlet is formed in the face surface of the bit body;

wherein the at least one port inlet ~~at least one port inlet including~~ includes a first end having a first cross-sectional area joined to ~~another end of said~~the at least one bore and extending to a second end having a second cross-sectional area larger than ~~said~~the first cross-sectional area, the second end ~~and~~ opening into ~~said~~the longitudinal cavity.

6. (Currently Amended) The core barrel assembly of claim 5, wherein ~~said~~the at least one port inlet comprises a generally conical shape.

7. (Currently Amended) The core barrel assembly of claim 5, wherein ~~said~~the at least one port inlet comprises a generally pyramidal shape.

8. (Currently Amended) A core bit for attachment to a core barrel assembly, ~~said~~the core barrel assembly including an outer barrel, an inner tube disposed within ~~said~~the outer barrel, and a core shoe disposed at one end of ~~said~~the inner tube, comprising:

a bit body including a face surface and further including an inner, substantially cylindrical, longitudinally extending cavity bounded by an inside diameter of ~~said~~the bit body, and configured to receive at least ~~said~~the core shoe therein;

wherein a flow path is defined by an annular region bounded by ~~said~~the inside diameter of ~~said~~the bit body and an outside diameter of at least ~~said~~the core shoe;

at least one cutter disposed on ~~said~~the face surface; and

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet~~having one end thereof in fluid communication with said at least one port outlet; and~~

wherein the at least one port inlet forms ~~at least one port inlet in fluid communication with another end of said at least one bore, said at least one port inlet forming~~ an angle of approach relative to ~~said~~the flow path defined by ~~said~~the annular region proximate the at least one port inlet of between about zero and 44 degrees;

wherein the at least one port outlet is formed in the face surface of the bit body.

9. (Currently Amended) The core bit of claim 8, wherein ~~said~~the angle of approach is about 30 degrees.

10. (Currently Amended) A core barrel assembly for cutting core samples in subterranean formations, comprising:

an outer barrel having one end attached to a drill string;

an inner barrel assembly disposed inside ~~said~~the outer barrel, ~~said~~the inner barrel assembly including an inner tube and a core shoe attached to one end of ~~said~~the inner tube;

a core bit attached to an opposing end of ~~said~~the outer barrel proximate ~~said~~the core shoe, ~~said~~the core bit including:

a bit body including a face surface and further including an inner, substantially cylindrical, longitudinally extending cavity bounded by an inside diameter of ~~said~~the bit body, at least ~~said~~the core shoe extending into ~~said~~the cavity;

wherein a flow path is defined by an annular region bounded by ~~said~~the inside diameter of ~~said~~the bit body and an outside diameter of at least ~~said~~the core shoe;

at least one cutter disposed on ~~said~~the face surface;

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet ~~having one end thereof in fluid communication with said at least one port outlet~~; ~~and~~

wherein the at least one port inlet ~~in fluid communication with another end of said at least one bore, said at least one port inlet forming~~ forms an angle of approach relative to ~~said~~the flow path defined by ~~said~~the annular region proximate the at least one port inlet of between about zero and 44 degrees;

wherein the at least one port outlet is formed in the face surface of the bit body.

11. (Currently Amended) The core barrel assembly of claim 10, wherein ~~said~~the angle of approach is about 30 degrees.

12. (Currently Amended) A core bit for attachment to a core barrel assembly including a core shoe of a predetermined exterior configuration, ~~said~~the core bit comprising:

a bit body including a face surface and further including an inner, substantially cylindrical cavity longitudinally extending therethrough;

at least one cutter disposed on ~~said~~the face surface; and

~~at least one port outlet disposed on said face surface;~~

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet ~~having one end thereof in fluid communication with said at least one port outlet~~; ~~and~~

~~at least one port inlet in fluid communication with another end of said at least one bore;~~

~~said~~wherein the at least one port outlet is formed in the face surface of the bit body;

wherein the at least one port inlet ~~opening~~ opens into ~~said~~ the cavity at a region thereof defining an annular reservoir, the annular reservoir configured to induce fluid recirculation zones in fluid passing therethrough ~~of a first volume between an inside wall portion of said cavity and an outside wall portion of said core shoe when disposed in said cavity; and~~

~~an inside wall portion of enlarged diameter providing, with said core shoe, an annular reservoir having a second volume up to 70 percent larger than said first volume~~.

13. (Currently Amended) A core bit for attachment to a core barrel assembly, ~~said~~the core barrel assembly including an outer barrel, an inner tube disposed within ~~said~~the outer barrel, and a core shoe of a predetermined exterior configuration disposed at one end of ~~said~~the inner tube, comprising:

a bit body including a face surface and further including an inner, substantially cylindrical cavity longitudinally extending therethrough, at least ~~said~~the core shoe extending into ~~said~~the cavity;

at least one cutter disposed on ~~said~~the face surface; and

at least one surface feature disposed on a wall of ~~said~~the cavity configured to individually impart resistance to fluid flow in a narrow annulus defined by ~~said~~the wall of ~~said~~the cavity and an outside surface of ~~said~~the core shoe.

14. (Currently Amended) The core bit of claim 13, wherein ~~said~~the at least one surface feature is selected from the group consisting of: at least one annularly extending squared edge; at least one annular, rectangular cross-sectional relief; at least one annular, triangular cross-sectional relief; and at least one annular, circular cross-sectional relief.

15. (Currently Amended) A core barrel assembly for cutting core samples in subterranean formations, comprising:

an outer barrel having one end attached to a drill string;

an inner barrel assembly disposed inside ~~said~~the outer barrel, ~~said~~the inner barrel assembly including an inner tube and a core shoe of a predetermined exterior configuration attached to one end of ~~said~~the inner tube;

a core bit attached to an opposing end of ~~said~~the outer barrel proximate ~~said~~the core shoe, ~~said~~the core bit including:

a bit body including a face surface and further including an inner, substantially cylindrical cavity longitudinally extending therethrough, at least ~~said~~the core shoe extending into ~~said~~the cavity;

at least one cutter disposed on ~~said~~the face surface; and

at least one surface feature disposed on a wall of ~~said~~the cavity configured to individually impart resistance to fluid flow in a narrow annulus defined by ~~said~~the wall of ~~said~~the cavity and an outside surface of ~~said~~the core shoe.

16. (Currently Amended) The core barrel assembly of claim 15, wherein ~~said~~the at least one surface feature is selected from the group consisting of: at least one annularly extending squared edge; at least one annular, rectangular cross-sectional relief; at least one annular, triangular cross-sectional relief; and at least one annular, circular cross-sectional relief.

17. (Currently Amended) A core bit for attachment to a core barrel assembly, ~~said~~the core barrel assembly including an outer barrel, an inner tube disposed within ~~said~~the outer barrel, and a core shoe of a predetermined exterior configuration disposed at one end of ~~said~~the inner tube, comprising:

a bit body including a face surface and further including an inner, substantially cylindrical, longitudinally extending cavity bounded by a wall of ~~said~~the cavity, at least ~~said~~the core shoe extending into ~~said~~the cavity;

wherein a flow path is defined by an annular region bounded by ~~said~~the wall of ~~said~~the cavity and an outside surface of at least ~~said~~the core shoe;

at least one cutter disposed on ~~said~~the face surface;

at least one port outlet disposed on ~~said~~the face surface;

at least one bore extending through ~~said~~the bit body between at least one port inlet and at least one port outlet~~having one end thereof in fluid communication with said at least one port outlet~~; and

wherein the at least one port inlet ~~opening~~ opens into ~~said~~the annular region and ~~including~~ includes a first end having a first cross-sectional area joined to ~~another end of said~~the at least one bore and ~~extending~~ extends to a second end having a second cross-sectional area larger than ~~said~~the first cross-sectional area, ~~said~~the at least one port inlet forming an angle of approach relative to ~~said~~the flow path defined by ~~said~~the annular region proximate the at least one port inlet of between about zero and 44 degrees.

18. (Currently Amended) The core bit of claim 17, further comprising at least one topographical feature disposed on ~~said~~the wall of ~~said~~the cavity configured to individually impart resistance to fluid flow in a narrow annulus defined by a portion of ~~said~~the wall of ~~said~~the cavity below ~~said~~the annular region and an outside surface of ~~said~~the core shoe.

19. (Currently Amended) A port structure for delivering drilling fluid to a face surface of a core bit, comprising:

~~a port outlet disposed on said face surface;~~

a bore extending through ~~said~~the core bit between at least one port inlet and at least one port outlet ~~having one end thereof in fluid communication with said port outlet~~; and

wherein the at least one port outlet is formed in the face surface of the core bit;

wherein the ~~a~~at least one port inlet ~~including~~ includes a first end having a first cross-sectional area joined to ~~another end of said~~the bore and extending to a second end having a second cross-sectional area larger than ~~said~~the first cross-sectional area.

20. (Currently Amended) The port structure of claim 19, wherein ~~said~~the at least one port inlet comprises a generally conical shape.

21. (Currently Amended) The port structure of claim 19, wherein ~~said~~the at least one port inlet comprises a generally pyramidal shape.

22. (Currently Amended) A port structure for delivering drilling fluid to a face surface of a core bit attached to a core barrel assembly, ~~said~~the core barrel assembly including an outer barrel, an inner tube disposed within ~~said~~the outer barrel, and a core shoe disposed at one end of ~~said~~the inner tube adjacent ~~said~~the core bit, at least ~~said~~the core shoe extending into an inner, substantially cylindrical cavity longitudinally extending into ~~said~~the core bit, wherein a flow path is defined by an annular region bounded by a wall of ~~said~~the cavity and an outside surface of ~~said~~the core shoe, ~~said~~the port structure comprising:

~~a port outlet disposed on said face surface;~~

a bore extending through ~~said~~the core bit between at least one port inlet and at least one port outlet~~having one end thereof in fluid communication with said port outlet~~; and

wherein the at least one a port inlet ~~in fluid communication with another end of said bore, said port inlet forming~~ forms an angle of approach relative to ~~said~~the flow path defined by ~~said~~the annular region proximate the at least one port inlet of between about zero and 44 degrees.

23. (Currently Amended) The port structure of claim 22, wherein ~~said~~the angle of approach is about 30 degrees.

24. (Currently Amended) A method of reducing a quantity of fluid flowing from an annular region bounded by a wall of a cavity through a core bit and an outside surface of a core shoe disposed therein, and into a narrow annulus therebelow defined by ~~said~~the wall of ~~said~~the cavity and ~~said~~the outside surface of ~~said~~the core shoe, ~~said~~the narrow annulus in fluid communication with ~~said~~the annular region, the method comprising:

providing a plurality of ports, each port including a bore and extending through the core bit between an inlet and an outlet;

reducing a quantity of fluid flow through the narrow annulus, the reducing comprising:

enlarging a cross-sectional area of ~~a~~the port inlet of each port of ~~a~~ the plurality of ports relative to a cross-sectional area of ~~a~~ the bore of each port of ~~said~~the plurality of

ports, each port inlet of ~~said~~the each port ~~in fluid communication with said~~proximate to the annular region; and

receiving fluid from ~~said~~the annular region into ~~said~~the enlarged cross-sectional area of ~~said~~ each port inlet.

25. (Currently Amended) A method of reducing a quantity of fluid flowing from an annular region bounded by a wall of a cavity through a core bit and an outside surface of a core shoe disposed therein, and into a narrow annulus therebelow defined by said wall of said cavity and ~~said~~ the outside surface of ~~said~~ the core shoe, said narrow annulus in fluid communication with ~~said~~ the annular region, the method comprising:

imparting an angle of between about zero and 44 degrees between ~~said~~ a flow path and ~~a~~at least one port inlet of ~~each port of~~ a plurality of ports ~~in fluid communication with said~~ proximate to the annular region; and

receiving fluid from ~~said~~ the annular region into ~~each~~ the at least one port inlet.

26. (Currently Amended) A method of reducing fluid flow into a narrow annulus defined by an inside surface of a core bit and an outside surface of a core shoe extending into ~~said~~the core bit, comprising:

imparting circumferential flow to fluid ~~collecting in~~within an annular reservoir in fluid communication with ~~said~~the narrow annulus; and

receiving ~~said~~the circumferentially flowing fluid in a plurality of ports in fluid communication with ~~said~~the annular reservoir.

27. (Currently Amended) A method of reducing fluid flow in a narrow annulus defined by an inside surface of a core bit and an outside surface of a core shoe extending into ~~said~~the core bit, comprising creating fluid recirculation zones along ~~said~~the inside surface of ~~said~~the core bit to impart resistance to fluid flow in ~~said~~the narrow annulus.

28. (New) The method of claim 24, further comprising recirculating fluid within the annular region.

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29. (New) The method of claim 26, further comprising recirculating fluid within the annular reservoir.